

"Interactive digital television network"

The present invention relates to a digital television network, a private television network in particular, for making, broadcasting
5 and monitoring interactive television programmes.

In the state of the art, there are solutions making it possible to produce digital television programmes which are broadcast over broadcasting networks such as cables, or over the airwaves, to
10 receivers of digital television programmes. In such programmes, several types of digital data may be exchanged. These consist chiefly of picture data, picture sequences, sounds, sound sequences, texts, graphics, commands and monitoring messages. The production of such a programme therefore
15 requires the manipulation within the framework of a command language of a large number of different types of data. Moreover, it must be possible to implement complete applications comprising several programmes, broadcast to different users, to modify existing programmes and other characteristics.

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The present invention makes it possible to implement a digital television network, of the kind comprising at least one broadcaster computer comprising data storage means and means for transmitting digital television applications, and at least one
25 device for executing at least one digital television application. It is characterized in particular in that the network comprises:

- an agencies centre installed on at least the broadcaster computer so as to create, modify and/or broadcast a television application;
- 30 - a transcoder or generator for transcoding the digital television applications emanating from the agencies centre;

- consoles for which the applications emanating from the transcoder and broadcast by at least one broadcasting channel are destined.

5 According to another aspect, the invention relates to a network characterized in that the agencies centre comprises:

- an agencies manager comprising a means of activating one at least of the agencies;
- a media agency comprising means for editing, in particular
10 retrieving means, centralizing means, and archiving means, and means for organizing the elements intended to make up at least one digital television application,
- a programmes agency comprising means for composing a
15 digital television application according to a predefinable tree and predefinable navigation, means for updating an application and means for determining broadcasting rules cooperating with means for producing programme execution lists (playlists) and with means for indexing and archiving the programmes and/or execution lists;
- a sites agency comprising means for distributing and
20 means for broadcasting programmes created or updated in the programmes agency.

25 According to another aspect, the invention relates to a network, characterized in that each agency comprises:

- a menu bar;
- a hierarchical list;
- a properties zone for the elements selected from the agency;
- 30 - a contents display zone.

According to another aspect, the invention relates to a network, characterized in that the properties zone of each agency comprises:

- a zone of types of elements to be selected,
- 5 - a zone for editing the name of the element to be selected;
- a zone for editing the values of the properties of the selected element.

10 According to another aspect, the invention relates to a network, characterized in that the content display zone for each agency comprises control means for selecting a mode of display in Table form, in Zoom form, in Caption form and in single or multiple Selection mode.

15 According to another aspect, the invention relates to a network, characterized in that the agencies manager also comprises an access rights manager which limits access of the agencies centre to the resources and target profiles according to the set where it is installed.

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According to another aspect, the invention relates to a network, characterized in that the media agency comprises means for executing one at least of the following functions:

- 25 ASSOCIATE: for filling in an element of another agency with the content of the medium;
- EDIT: for modifying the content of the medium;
- REPLACE: for changing the physical file of the medium.

30 According to another aspect, the invention relates to a network, characterized in that the media agency also comprises means for executing at least one of the following functions: Display, New, New/Folder, New/Medium, Rename/Modify, Delete, Copy,

Duplicate, Move, Export, Import, Add, Add/Video, Add/Picture, Add/Audio, Add/Text, Add/File, Replace.

5 According to another aspect, the invention relates to a network, characterized in that the media agency comprises means for processing one at least of the following objects: Folder, Video, Picture, Sound, Text, Internet file, database file.

10 According to another aspect, the invention relates to a network, characterized in that the programmes agency comprises means for executing one at least of the following functions:

GENERATE for initiating the generation of the source code and sending it to the generator;

DISPLAY for displaying the scene such as on a TV screen;

15 MEDIA AGENCY for opening the media agency while automatically pointing to the medium associated with the current element;

CHANGE MEDIUM for selecting another medium from the media agency and associating it with the current element;

20 EDIT THE CONTENT for creating or modifying the content of the associated medium and hence of the current element;

EMPTY THE CONTENT for breaking the link-up between associated medium and the current element.

25 According to another aspect, the invention relates to a network, characterized in that the programmes agency also comprises means for executing at least one of the following functions: Display, New, New/Folder, New/Element, New/Programme, Rename/Modify, Delete, Delete the link-ups, Copy, Paste,
30 Duplicate, Move, Export, Import, Medium, Content, and others still.

According to another aspect, the invention relates to a network, characterized in that the programmes agency comprises means for processing one at least of the following objects: Folder, PLAYLIST execution list, TIMED PLAYLIST synchronized
5 execution list, "CITYLINE" interactive directory, Catalogue, Module for executing programme lists (JUKE-BOX), Advertisements insertion module (ADS-INSERT), Training, Module for managing stock market programmes (INFO-STOCK), Weather Services, electronic commerce (e-commerce), electronic
10 banking (e-bank), electronic magazine (e-zine), and others still.

According to another aspect, the invention relates to a network, characterized in that the programmes agency comprises means for processing one at least of the following elements: Structure,
15 Video, Sound, Picture, Text, Design, Page, List, Slide Show, Scene, Routing, Instruction, Button, and others still.

According to another aspect, the invention relates to a network, characterized in that the agencies centre and the generator are
20 installed on at least two separate sets or stations connected by a communications network.

According to another aspect, the invention relates to a network, characterized in that the agencies centre 4 is distributed between
25 at least one main agency (61) and one or more secondary agencies (61-1 to 61-n) on at least one implementation system.

According to another aspect, the invention relates to a network, characterized in that the codes generator cooperates in a
30 production system with a General agency for the generation of the applications and with a module for managing the data and real-time streams.

According to another aspect, the invention relates to a network, characterized in that the production system is connected by a bidirectional link with a Distribution system comprising in particular a stream server itself connected to at least one broadcasting network with customer stations.

According to another aspect, the invention relates to a network, characterized in that the codes generator comprises means for processing each digital television application, which itself comprises:

- means for processing parameters individual to each application and valid for all the other component elements such as TV Objects;
- means for processing broadcasting parameters making it possible to identify the channel on the customer station;
- means for processing screens of the application;
- means for processing data of the application.

According to another aspect, the invention relates to a network, characterized in that the means for processing data of the application comprise:

- means for processing an application Name;
- means for processing an application ID identifier;
- means for processing a Palette identifying the colours of TV Objects displayed;
- means for processing a code for access to the application being broadcast (DVB trio);
- means for processing a List of TV scenes each of a type chosen from among:
 - single scenes;
 - multipage scenes;

- scenes with menu-list.

According to another aspect, the invention relates to a network, characterized in that the means for processing a list of TV scenes also comprise means for processing at least one single scene which comprise:

- means for processing a Name designating the scene;
- means for processing a Duration of display of the scene;
- means for processing a List of TV Objects making up the scene.

According to another aspect, the invention relates to a network, characterized in that the means for processing a list of TV scenes also comprise means for processing at least one multipage scene which comprise:

- means for processing a Name designating the scene;
- means for processing a Duration of display of the scene;
- means for processing a List of TV Objects making up at least one page of the scene;
- means for processing a List of TV pages making up the scene.

According to another aspect, the invention relates to a network, characterized in that the means for processing a list of TV scenes also comprise means for processing at least one multipage scene which comprise:

- means for processing a Name designating the scene;
- means for processing a Duration of display of the scene;
- means for processing a List of TV Objects making up at least one page of the scene;
- means for processing a List of TV menu-lists making up the scene.

According to another aspect, the invention relates to a network, characterized in that the means for processing a List of TV pages making up the scene comprise means for processing at least one TV page which comprise:

- means for processing the Name designating the TV page;
- means for processing a Duration of display of the TV page;
- means for processing a List of TV Objects individual to the TV page.

10 According to another aspect, the invention relates to a network, characterized in that the means for processing a List of TV menu-lists making up the scene comprise means for processing at least one TV menu-list which comprise:

- means for processing a List name of the TV menu-list;
- 15 • means for processing a List of TV headings;
- means for processing a List of TV Objects individual to the TV scene with which the TV menu-list is associated.

20 According to another aspect, the invention relates to a network, characterized in that the means for processing a List of TV headings also comprise:

- means for processing a heading Name of the associated TV menu-list;
- means for processing a List of TV Objects representing the heading;
- 25 • means for processing a TV Object containing the TV page definition associated with the heading.

30 According to another aspect, the invention relates to a network, characterized in that the means for processing a TV Object or lists of TV Objects manipulate one of the types of TV Objects

selected from among: text objects, design objects, picture objects, routing objects, instruction objects.

According to another aspect, the invention relates to a network,
5 characterized in that the generator or transcoder comprises means for splitting into unit blocks compatible with the constraints of the target systems the programmes emanating from the implementation and/or production agencies, each unit block corresponding to a scene, and in that it comprises means
10 for producing as a function of each unit block a plurality of programme lines in low-level language, each television programme line comprising at least one of the following elements:

- identification;
- 15 • type;
- content;
- properties;
- link-ups.

20 Other characteristics and advantages of the present invention will be better understood with the aid of the description which contains tables of which the text forms part and appended drawings which are:

- Figure 1 : a general diagram of a digital television network
25 according to a preferred embodiment of the invention;
- Figure 2 : a block diagram of an agencies manager in the embodiment of Figure 1;
- Figure 3 : a diagram of a part of an agencies manager in the embodiment of Figure 1;
- 30 - Figure 4 : a diagram of another part of an agencies manager in the embodiment of Figure 1;

- Figure 5 : a diagram of another part of an agencies manager in the embodiment of Figure 1;
- Figure 6 : a flowchart for utilizing a television network in the configuration of the embodiment of Figure 1;
- 5 - Figure 7 : a block diagram of another embodiment of the invention.

I. VOCABULARY

- 10 In the subsequent description, the following terminology is used:
- "Software", a particular application generally dedicated to the implementation of or to the assistance with known tasks (compatibility of exchanges, text processing, etc.),
 - "Application", a computer means which executes a collection of
 - 15 tasks in response to commands from a remote control, a keypad, or more generally an input system,
 - "Programme", an interactive, audiovisual sequence, such as a game or a film, for implementing known tasks and/or for broadcasting a continuous audiovisual sequence,
 - 20 - "Interactive", the quality of a computer object of intervening in the running of an application or of a programme (as opposed to a film for example, which runs continuously and uninterruptibly),
 - "Execution list", an ordered list of programmes intended to be broadcast on an audiovisual support: television programme, CD-
 - 25 ROM-type optical disk, etc.
 - "Programming", the equivalent of an Execution list, but including the concept of time scheduling (programming of television channels is one example of this),
 - "Element", the generic term designating concepts, objects
 - 30 manipulated on the television network of the invention (more particularly, in the programmes agency, the elements are the components of the programmes), such as TV Objects,

- "Content", the generic term designating the source, the subject matter of a medium: text, pictures, sounds, videos,

- "Media", the generic term designating computer files containing sources of text, picture, sound and video type, emanating from multimedia means, that is to say those deploying elements originating from various media.

II. STRUCTURE OF THE NETWORK

The components of a network according to one embodiment of the invention, as represented in Figure 1, will now be described.

The digital television network of the embodiment comprises a broadcaster computer 1 equipped with known office resources.

The broadcaster 1 executes an application which makes it possible to produce, edit and broadcast digital television programmes to the consoles constituting the Stations of the customers 2 of the network. Each Customer station is connected up to the network by any suitable communication channel 3.

The broadcaster 1 can comprise one or more computers working in tandem, especially in a local area network, a worldwide network such as the Internet in an external version (web or ftp) or internal version (Intranet).

An application designated by the expression "agencies centre" 4 which mobilizes computer resources 5 for building projects 6 as a function of target profiles 7 is executed on the broadcaster 1. The agencies centre 4 produces television applications via an output 9 to a memory for static data 8 destined for a broadcasting generator 11 which produces, in a language

tailored to the transmission channel 3 and to the stations of the customers 2, the broadcast applications.

5 In a first embodiment, the agencies centre 4 produces, under the control of a programmer user, at least one digital television application.

10 For this purpose, the agencies centre 4 mobilizes computer resources 5 as a function of target profiles 7 so as to compile projects 6. The computer resources comprise hardware elements such as disk files or network files, multimedia broadcasting facilities, etc., and software elements such as lists, screen pages, audiovisual scenes, etc. The target profiles constitute precompiled programming frameworks which the user may then
15 reprogramme as he/she desires into at least one project, as is well known in the techniques of object programming. These various elements will be described further later on.

20 The digital television application produced by the centre 4 is written in a task description language such as the XML language or some other high-level computer language and is forwarded to a descriptions generator 30 one output of which is connected to the low-level language applications generator 11 intended for any user station connected to the network, directly or otherwise.
25 During the production process relating to the digital television applications according to the invention, the codes emanating from the codes generator 12 are transmitted to the application generator 13 which may possibly receive the data from the data generator 14, and which produces by way of output a list which
30 constitutes a picture of the tunings and start-up trials for service streams on the broadcasting network. The low-level language applications generator 11 returns a trial code to an error

manager module 31 which is connected to the agencies centre 4 so as to allow tailored tuning under the control of the programmer or of a tuning handler.

5 In another embodiment, which will be detailed later with the aid of Figure 6, the agencies centre 4 of the embodiment of Figure 1 is divided over several worksets, for example linked by a local area network. Each set comprises rights of partial access to the resources of the agencies centre 4, so that a given set produces
10 a part of a digital television programme which is transmitted to another set endowed with rights of higher access which may then transcode it so as to prepare for the broadcasting thereof.

Returning to the embodiment of Figure 1, the broadcasting
15 generator 11 chiefly comprises a codes generator 12, connected to an applications generator 13, which receives data from a data generator 14. The output 15 from the generator 11 can be stored in a dynamic data memory 16 which can also be read-accessed via a link-up 17, especially when one or more customer stations
20 return data to the broadcaster 1 as is the case in an interactive television application.

The dynamic data memory 16 is connected by a bidirectional link
25 20 to a communications manager 19 whose output is connected to the communications channel 3.

The communications channel 3 chiefly comprises a link 21 with the communications manager 19, which is linked to a communications generator 22 which, as a function of the
30 application installed on the customer stations 2, generates and monitors the streams between the broadcaster 1 and the various customer stations 2 by virtue of a distribution network 23

connected to a private network 24 (for example, the wiring of a building and a link 25 of the network 24 to the station 2) or directly over a distribution network 23, 25 such as the switched telephone network, a link over the airwaves, etc.

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The customer station 2 chiefly comprises a digital television programmes reader 26 connected to a console 27 for reading and, possibly in an interactive television application, for inputting commands or for interventions of the user of the customer station 2; and a local memory 28 storing the programmes and the data of the television application currently being executed.

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The customer station 2 is managed by so-called customer digital television platform station management software 29 which depends on the customer station 2, for example the digital television network access provider.

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The communications manager 19 is furnished with software applications which allow communications of one or other of the following types:

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- text and according to the international protocol ftp (file transfer protocol);
- database according to one or other of the standards for multimedia databases (ODBC or PRC, in particular);
- web-type http protocol; or
- Télétel or Minitel protocols.

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The assembly consisting of the dynamic data memory 16 and the communications manager 19 is, in a preferred embodiment, associated in an electronic commerce software application 30. In such an application, especially in an interactive television network, the exchanges of data and of interactive television

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applications are monitored in particular so as to establish payment by each user or customer connected to the network. Such electronic commerce applications may also be utilized within the framework of the network of the invention.

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The agencies centre will now be described with the aid of Figures 1 and 2. The agencies centre makes it possible to create, modify and broadcast any television application, interactive or otherwise. The centre 2 deals with the complete
10 implementation process from the retrieval of the files in the memories 8 and 16 of the network, through page layout and predisplay before sending the television application over the network, and up to the recording of an optimized stream on the broadcasting server.

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This collection of tasks is carried out by three agencies, all operating in the same way, each being dedicated to implementation of a complete phase of a digital television application:

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1. The media agency 41 constitutes a means for editing and organizing the content. It allows the retrieval, centralization, archiving and organization of all the media intended to make up the channel or the interactive application.

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2. The programmes agency 42 constitutes a means of editing and updating the programmes. It makes it possible to build an interactive application according to a tree and a navigation both of which can be defined when composing the programme or the
30 set of interactive television programmes (CityLine®, Juke-Box TV®, OpenShop®, Finance-Line®, etc.) or any other specific interactive application, in particular when the latter requires

content updates. The programmes agency also makes it possible to implement so-called "PlayList" execution lists while defining the broadcasting rules of the media thereof.

- 5 The updates are then dynamic and may be performed as often as desired.

The various programmes and programmings thus implemented may then be indexed and archived for subsequent use.

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3. The sites agency 43 constitutes a means of broadcasting the programmes. It makes it possible to broadcast the programmes formulated with the programmes agency 42.

- 15 For mass public broadcasts (satellite, cable, etc.), the agency 43 comprises a means for referencing the applications generators and broadcasting servers in place, so that the generators such as the generator 11 (Figure 1) can deposit their streams directly on the desired servers.

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Within the framework of private networks, the sites agency 43 comprises a means for customizing the broadcast as a function of site typology, groups of sites, lone sites, or even of television screen, of times and days of the week.

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- The feedback of information making it possible, in the case of interactive television networks, to concentrate the usage statistics for the applications package systems is also managed from the sites agency 43. It is then possible to accurately ascertain the time of use per set, the dates of inquiry, the most requested information, etc. in order to best tailor its products.
- 30

All the information from the three agencies 41 to 43, managed, stored and manipulated by the agencies, can be exported in various formats (Profile, Tabulated Ascii, XML etc.), and constitutes an exact description of the desired programme.

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Depending on the format thereof, this information may be read directly by navigation applications (Internet navigators known as "web browsers" or the like) or tailored systems (television managers, etc.), or else be retrieved automatically by application generators and data generators, which then produce the desired applications.

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According to an important characteristic of the invention, the three agencies 41 to 43 all operate according to the same principle. To each agency there corresponds a window, and all the windows have the same presentation and operate in the same way which it is therefore easy to learn quickly, all the more so since the user interface is chosen according to the standard interfaces for computing.

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The agencies 41 to 43 manipulate icons and transitory menus (of the "pop-up" type). To construct an application, it is sufficient to copy existing models, in the static data memory 8, and to tailor them to the requirements of the television application currently being produced or updated.

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The icons represent conventional objects: pictures, texts, screens, etc. which are customized by parametrizing them with the aid of "pop-up" transitory menus or keypad input.

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Whatever the target system, public or private television, personal computer, etc., the agencies centre 4 does not necessitate the learning of any specific language.

5 According to another advantageous characteristic of the invention, the agencies centre 4 makes it possible to produce applications for any type of interactive audiovisual platform. Specifically, the agencies centre 4 according to the invention translates all the information into a language which caters for the
10 main platforms. This translation is then retrieved by the applications generator 11 which compiles it and automatically implements all the tasks required for the final production of the television application. Obviously, there are as many generators as target systems and especially three generators make it
15 possible to produce applications for the following systems: StreamCast®, OpenTV®, MediaHighway®.

This architecture makes it possible to broaden the range of target systems by optimizing the means:

- 20
- a new target system merely requires the production of a new generator;
 - no new interface need be relearned in order to produce an application on this new system.

25 According to another advantageous characteristic of the invention, the pair consisting of the agencies centre 4 and generator 11 permits delocalizing of the worksets. The various software communicate via the Internet network layer (with the aid of applications known as "sockets") and can work remotely as if
30 they were installed on the same set.

According to another characteristic of the invention, the agencies centre 4 comprises a means for permitting several levels of use, thus making it possible to install an update version at the final customer, so that he can himself perform his content modifications. Several levels of use defining access rights are provided, from simple inquiry, through modification of a display or the addition of a header within a screen, up to the complete creation of programmes.

According to another advantageous characteristic of the invention, the broadcaster 1 also comprises a generator of descriptions 30 of the applications currently under production from a master set and a manager of errors 31 producing reports regarding any errors.

The programmes are created in the programmes agency 42 by actions on the simple programme elements, which are similar to those performed within office tools: selection, so-called "pop-up" transitory menu, keypad input, copy/paste, etc.

Each screen making up the programme can be viewed on the production set before broadcasting.

When the programme has terminated, it is sufficient to press the "Generate" key. The programme is sent to the generator 11 which will produce an application thereof. It merely remains to test the application in a real situation.

According to another characteristic of the invention, the updating of a programme runs in almost the same way, except that the programme is already created. One merely needs to change the

contents of the elements, then to display on the update set the result of the modifications made.

Once validated, the programme need merely be regenerated by pressing the "Generate" key. The programme will be sent to the generator 11 which will perform the update and will produce the new version of the programme.

There is a saving system which makes it possible to store the earlier versions of the programmes, so as to be able to retrieve them and reuse them subsequently.

Any programme implemented in the programmes agency 42 can be exported so as to be reutilized by another agency.

There are two export formats, TXT and XML, which allow any other piece of software able to analyse and import these formats to retrieve the entire programme as it was defined in the programmes agency.

This export format can also be used to perform saves of these programmes.

Represented in Figure 3 is the common architecture of the three agencies 41 to 43 making up the agencies centre 4 (Figure 1) according to the preferred embodiment of the invention. Each agency 41 to 43 is callable by an agencies manager 40 which will be described later.

Each agency comprises software which is executed in a window on one or more computers or the like. The windows of the agencies are all organized in the same way and each agency window comprises four main zones described in Figure 3: a menu

bar 45, a hierarchical list zone 46, a contents display zone 47 and a properties zone 48.

5 The menu bar 45 groups together all the functions applicable in the current agency. These functions are similar to the conventional office software. The function applies always to the element, or to the group of elements, currently undergoing selection in the agency. The selections are performed in two ways, with the hierarchical list or from the Display table.

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The drop-down menu also appears by clicking with the right button on an element from the hierarchical list or from the display table. This system allows direct specification of the element relevant to the function which will be chosen from the menu.

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The hierarchical list 46 makes it possible to organize and select the elements. Depending on the current agency, it makes it possible for the elements manipulated by the agency (media, programmes and broadcasting sites) to be arranged arbitrarily.

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The hierarchical list 46 is synchronized with the other zones of the agency window 44. When an element is selected, the content display zone 48 and properties zone 47 automatically update themselves so as to display the information relating to the selected element.

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The content display zone 48 offers the possibility of several ways of consulting the content relating to the element selected from the hierarchical list. One switches from one mode to the other by clicking on the corresponding tab. Refer also to Figure 5.

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The Table mode 55 makes it possible to consult the list of elements making up the element selected from the hierarchical list 46. This mode is available only for elements which can contain others: folders, programmes, scenes, pages, etc. The table generally comprises several columns. By default, the table is always sorted in alphabetical order of the "Name" column, but it is possible to modify the sort order by clicking on the title of the column of one's choice. With each click, the table is sorted alternately in alphabetical order and in reverse alphabetical order.

The Zoom mode 56 is reserved for the case of media and of basic elements (pictures, texts, etc.), the display zone 48 displays the content, that is to say the associated physical file, directly.

The Caption mode 57 is an intermediate mode between the Zoom and Table modes. The collection of elements making up the selected element is displayed in the form of an array, the elements having associated physical files being displayed directly in reduced form.

The Selection mode 58, just as with the hierarchical list 46, renders the contents display zone 48 interactive and makes it possible to select elements. The properties zone 47 is then synchronized with the selected element: the synchronization also operates in the other two modes: caption and zoom. The various ways of selecting an element are:

- in Table mode: click on a row;
- in Caption mode: click on a box of the array;
- in Zoom mode: the element displayed is automatically selected. A change of element and hence a change of

selection is effected by scrolling the elements with the vertical scrollbar.

5 Certain accelerators make it possible to switch directly into Zoom mode:

in Table mode: double click on an element;

10 in Caption mode: click on a selected element, or double click on an unselected element.

15 It is also possible to backtrack one level in the hierarchical list by clicking on the "backtrack" icon in the top right of the display zone.

20 Unlike the hierarchical list, the display table comprises a means for selecting several elements by clicking successively on the elements whilst pressing the "CTRL" or "SHIFT" keys. The "CTRL" key selects the elements one by one whilst the SHIFT key selects all the elements included between the previous click and the click associated with the "SHIFT" key. In this case, the properties are resynchronized with the element selected from the hierarchical list.

25 The properties zone 47 is reproduced in Figure 4 and displays the collection of information relating to the selected element:

- type of the selected element 51 in a type zone for example by tabs or by icons;
- name of the selected element 52 in an alphanumeric zone;
- 30 • properties of the selected element 53 in various conventional computer objects such as list zones, buttons, group zones, etc.

These properties are individual to each type of element and depend on the current agency. The details of the properties of each type of element are described in each of the agencies.

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On the other hand, the properties zone operates in the same way for all the elements. Most of the values displayed can be modified with the aid of "pop-up" transitory menus or of keypad input zones.

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All the modifications are automatically taken into account and stored. It is never necessary to record one's modifications.

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Certain values relating to display, such as colours, font, etc., are automatically carried over into the display zone when the Zoom mode is activated.

The three agencies of the agencies centre will now be described briefly, these being:

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- the media agency;
- the programmes agency;
- the sites agency;

which are called from an agencies manager (40 in Figure 2).

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The agencies manager (40 in Figure 2) is the main window for calling the aforesaid agencies. It is essentially implemented as a toolbar which is always available and makes it possible to call the desired agency. The toolbar therefore contains three buttons each reserved for one of the three agencies (41-43). However,

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the agencies manager is connected to an access rights manager which limits access of the agencies centre to the resources and target profiles depending on the set where it is installed.

The media agency is an agency specialized in organizing and managing the media, that is to say the physical files - the contents - of the programmes.

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The media agency makes it possible to reorganize and rename the media in such a way, doing so without ever changing anything with regard to the resources (hard disk, memories, networks), as to create its own folders, give more sensible names to the contents, organize the contents by programme, by version, by screen, by type of medium without any risk of modifying the physical supports in any way.

The programmes agency 42 is a means of creating and updating audiovisual programmes, interactive or otherwise. It organizes the programmes which are predisplable on the agency 42 such as they will be displayed on a customer station 2.

All the creation functions, modifications are available: create, change, duplicate, delete screens, modify, add, delete contents, position, parametrize the contents in the screens, display all or part of a screen as on a television set. The programmes thus implemented are in their turn available to generate a complete televisual application, to generate an update of the programme, or to serve as basis for a new application.

The main elements of the three agencies will now be described in detail whilst referring to the comparable elements already mentioned.

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III. MEDIA AGENCY

The media agency is specialized in the management of contents, that is to say the physical files of pictures, texts, videos and sounds. The media agency comprises a means for displaying in the screens of the programmes elements originating from a medium:

- a picture on the screen will be displayed via an element of picture type filled in by a medium of picture type;
- a text on the screen will be displayed via an element of text type filled in by a medium of text type, etc.

The media agency provides the subject matter, whilst the programmes agency manages their formatting:

- a medium of picture type provides the photo of a product whilst the picture element indicates the position of the picture (the photo of the product), for example in the form screen produced;
- a medium of text type provides the attention-grabber "Issue of the month!", whilst the element of text type indicates the position of this text on the screen, the character font to be used, the colour, etc.

This principle of segregation between content and formatting is important since it is the basis of numerous functionalities.

The updates may be performed simply by changing content without jeopardizing the presentation of the programmes.

One and the same medium can be used in several different screens, its modification bringing about the automatic updating of all the screens at the same time. For example: the price of a product is present in three screens: the product list, the product

form and the purchase note. The principle of segregation makes it possible to update the price on all the screens in one go.

5 The media agency therefore acts as a catalogue or a customizable multimedia database:

- The media are catalogued, organized, sortable and reusable;
- Each medium can be used at several different locations;
- The indexing and naming are unrestricted.

10 The media agency adopts the colour code, for example, blue, which renders it easily recognizable from among the three agencies of the centre, borrows all the characteristics of a general agency window and adds the objects and functions required for the specific management of the media which are:

- 15
- the ASSOCIATE function: for filling in an element of another agency with the content of the medium;
 - the EDIT function: for modifying the content of the medium;
 - the REPLACE function: for changing the physical file of the medium.

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The menu bar comprises the commands which deploy the means for performing and executing the following functions:

Function	Description
Display	Displays the selected medium.
New	Displays the submenu for creating media.
New/Folder	Opens the input window for creating a folder at the level of the selected element.
New/Medium	Opens the input window for creating a medium at the level of the selected element.
Rename/	Opens the input window for renaming or [F2]

Modify	changing the type of element selected.
Delete	Deletes the selected element or elements.
Copy	Stores the selected element or elements in memory with a view to executing the following functions.
Duplicate	Duplicates the medium or media copied at the level of the element selected (the duplicated media will share the same physical files as the source media (files will not be duplicated on the physical supports)).
Move	Moves the medium or media copied at the level of the selected element.
Export	Exports the description of the selected element → a file <name_element>.txt is generated in the ROExp directory of the agency.
Import	Imports the description of an element from an export file (export from a third-party application).
Add	Displays the submenu for adding a medium from a physical file.
Add/Video	Opens the video selection window to add a medium at the level of the selected element → the recognized physical files have the extensions: AVI, MPG, MOV.
Add/Picture	Opens the picture selection window to add a medium at the level of the selected element → the recognized physical files have the extensions: BMP, JPG, GIF, TIF, PIC.
Add/Audio	Opens the selection window for adding an audio medium at the level of the selected element → the recognized physical files have the extensions: WAV, RM, MOV.

Add/Text	Opens the text selection window for adding a medium at the level of the selected element → the recognized physical files have the extensions: TXT, INI.
Add/File	Opens the multifile selection window for adding any medium at the level of the selected element → the recognized physical files have the same extensions as those mentioned above.
Replace	Opens the selection window corresponding to the type of medium selected so as to replace its physical file → the elements of the other agencies associated with this medium will have the new selected physical file as content.

The hierarchical list remains similar to the hierarchical lists of the other agencies.

- 5 The Display zone carries the various aforesaid modes. In the Table mode, the list of media contained in the folder selected from the hierarchical list is displayed. The five columns of the table displayed in Table mode correspond to the following information:

10

Name	Name of the medium in the agency (file name).
Type	Type of the medium (text, picture, sound, etc.).
File	Name of the physical file constituting the content of the medium.
Extract	Reserved for future use.
Folder	Complete path of the folder containing the physical file.

The Zoom mode displays the content of the physical file referenced by the medium selected from the hierarchical list. This mode makes it possible to access two particular functions individual to this agency:

5

Function	Description
Edit the content	Initiates the Windows® application associated with the physical file type referenced by the current element. For example, Paint® for a dot- type file ("bitmap".BMP), etc. → as long as the application initiated is active, the agency is disabled.
Replace the file	Opens the selection window corresponding to the physical file type associated with the current element Cf. the selection windows.

In Caption mode the list of media contained in the folder selected from the hierarchical list is presented in array form.

10 In the Properties zone 48 associated with the media agency 41, the media agency comprises means for producing seven types of medium, namely:

1. folder
2. video
- 15 3. picture
4. sound
5. text
6. HTML
7. Database

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Each type of medium is defined by properties selected by the programmer on the media agency namely:

for the "folder" type:

Description	serves to group together and to organize the media.
Hierarchy	Node element which can contain any medium in the agency of media including the folders.
Link-up	Video element of the programmes agency.

for the video type:

Description	References a video physical file
Hierarchy	Terminal element, cannot contain any other element
Link-up	Video-element of the programmes agency

Function	Description
Associate	Associates the current video-medium with the video-element selected from the programmes agency

Property	Type	Description	Possible values
File	Text 256 car.max.	Complete path of the physical file	<reader>:\<folder>\.\<file>
Extract	Text 12 car.max.	Reserved for future use of access to a Database	

5

for the "picture" type:

Description	References a picture physical file
Hierarchy	Terminal element, can contain no other element
Link-up	Picture-element of the programmes agency

Function	Description
Associate	Associates the current picture-medium with the picture-element selected from the programmes agency

The properties of the "picture" type are identical to those of the previous medium type.

for the "sound" type:

5

Description	References an audio physical file
Hierarchy	Terminal element, can contain no other element
Link-up	Audio-element of the programmes agency

Function	Description
Associate	Associates the current audio-medium with the audio-element selected from the programmes agency

The properties of the "sound" type are identical to those of the previous medium type.

10

for the "text" type:

Description	References a text physical file
Hierarchy	Terminal element, can contain no other element
Link-up	Text-element of the programmes agency

Function	Description
Associate	Associates the current text-medium with the text-element selected from the programmes agency

The properties of the “text” type are identical to those of the previous medium type.

For the “html” type:

Description	References an html physical file for Internet connection
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5 for the “database” type:

Description	References a database
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IV. PROGRAMMES AGENCY

10 The programmes agency is specialized in the creation and updating of programmes. These programmes are typical applications, composed of elements which can be devised individually in one’s way, provided that the envisaged behaviour is complied with: ordered lists “playlist”, catalogues, training, etc. A programme generally consists of the following elements:

- 15
- Scenes, which correspond to the logic screens of the application, for example: the résumé, the purchase note, the MCQ (“multiple choice questionnaire”).
 - Generic elements, which are common to several screen scenes - and are used by the application when it needs them,

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 - for example: an “Exit” or OK” button, etc.

The scenes are in turn composed of programme elements which manage the formatting and behaviour of the screens of the application:

- 25
- a picture element specifies the position of a picture medium on the screen;
 - a text element specifies the position of a text medium on the screen, as well as the character font and the colour to be used, etc.

Other more complex programme elements make it possible to manage off-the-shelf functionalities:

- A list element automatically manages a list of choices on the screen;
- The page elements make it possible to chop a screen into several pages displayed on the same background;
- The routing element makes it possible to indicate the navigation to another screen, possibly according to certain conditions, etc.
- The instruction element makes it possible to insert automatic function modules, such as for example connection for sending a command, or the input of a bank card, etc.

Once these programmes have been customized, the programmes agency makes it possible to:

- display the screens one by one in all possible states: selection of headings of a menu, scrolling of pages, etc.
- generate the source code and send it to the generator corresponding to the application type chosen.

This principle of operation is important since it permits the following possibilities:

- Display the application under the conditions, without necessarily possessing the specific development environment: decoder, television set, etc.
- Tune applications independently of the intended target system
- Reuse these programmes to implement updates or similar programmes, but with other contents.

The programmes agency therefore acts as a multiplatform application editor:

- Drafting the layout of programmes before implementation;
- Tuning of programmes and generation of applications;
- Updating of content;
- Reuse of all or part of an existing programme in the agency.

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The programmes agency adopts the colour code, for example yellow, which renders it easily recognizable from among the three agencies of the centre, borrows all the characteristics of a general agency window and adds the objects and functions required for the specific management of the programmes:

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- The GENERATE function for initiating the generation of the source code and sending it to the generator;
- The DISPLAY function for displaying the scene such as on a TV screen;

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- The MEDIA AGENCY function for opening the media agency while automatically pointing to the medium associated with the current element;

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- The CHANGE MEDIUM function for selecting another medium of the media agency and associating it with the current element;

- The EDIT CONTENT function for creating or modifying the content of the associated medium and hence of the current element;

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- The EMPTY CONTENT function for breaking the link-up between associated medium and the current element.

The menu bar comprises the commands which deploy the means for performing and executing the following functions:

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Menu option	Function
Display	Displays the element selected such as on a TV screen.
New	Displays the submenu for creating programme elements.
New/ Folder	Opens the input window for creating a folder at the level of the selected element.
New/ Element	Opens the input window for creating a programme element at the level of the selected element.
New/ Program	Opens the input window for creating a programme at the level of the selected element. This function is available only in author mode.
Rename/ Modify	Opens the input window for renaming or changing the type of element selected.
Delete	Deletes the selected element or elements.
Delete the link-ups	Deletes the link-up - the association - medium with the selected element or elements → the programme elements retain their properties but no longer have content.
Copy	Stores the selected element or elements with a view to executing the following functions.
Paste	Duplicated in the media link-ups, the element or elements copied, at the level of the selected element → the duplicated elements have the same properties as the source elements, but are empty (no content).
Duplicate	Duplicated with the media link-ups, the element or elements copied, at the level of the selected element → the duplicated elements will share the same media - and therefore the same contents - as

	the source elements (the media will not be duplicated in the media agency).
Move	Moves the copied element or elements at the level of the selected element.
Export	Exports the description of the selected element → a file <name_element>.txt is generated in the ROLexp directory of the agency → execute from a programme, this function allows saving as well as the transfer of a programme from one agency to the other.
Import	Imports the description of an element from an export file → execute from a programme file, this function allows recovery thereof as well as the retrieval of a programme from another agency.
Medium	Opens the selection window of a medium in order to associate it with the current element.
Content	Opens the selection window corresponding to the type of element selected so as to define or edit its content.

The hierarchical list of the programmes agency exhibits the same characteristics as those common to the agencies.

- 5 The Table mode displays the list of programmes or of programme elements contained in the folder, the programme or the element selected from the hierarchical list.

The columns correspond to the following information:

Name	Name of the element in the agency.
Type	Type of the element.
Associated medium	Name of the medium associated with the element.

Reminder: it is the medium which provides the element with the content. The element manages only the formatting parameters.

5 The Zoom mode displays the content of the medium associated with the element selected from the hierarchical list.

The Zoom mode is available only for elements which can be associated with a content and makes it possible to access four particular functions individual to this agency:

Function	Description
Media agency	Calls the media agency while positioning itself on the medium associated with the current element.
Change medium	Opens the selection window so as to associate a corresponding medium with the type of the current element. Cf. the selection windows.
Associate a medium	When the element is empty, that is to say when no medium is associated, this button is called "Associate a medium".
Edit the content	Initiates the Windows® application associated with the physical file type referenced the medium associated with the current element.
Define the content	For example, Paint® for a BMP file → as long as the application initiated is active, the agency is disabled. When the element is empty, that is to say when no medium is associated, this button is called "Define the content". In this case, the function opens the selection window corresponding to the physical file type associable with the current element. By clicking on validate, the medium is automatically created in the media agency, before being automatically associated

	with the current element. Cf. the selection windows.
Empty any content	Breaks the link-up - association - between the current element and the associated medium. → The current element retains its formatting properties but no longer has any content. From this mode, there are two ways of reassociating the content with the current element: 1) via the "Associate a medium" function by selecting a content already present in the media agency. 2) via the "Define a content" function by directly selecting a physical file on the hard disk. In this case, the corresponding medium is automatically created in the media agency before being associated with the current element.

The Caption mode presents in the form of an array the list of elements contained in the folder, the programme or the element currently being selected from the hierarchical list. Depending on the type of element, the caption displays the content or a message when a terminal element is involved, or the icon of its type when a node element is involved. In this case, the selecting of the icon amounts to "descending" through the hierarchy and is equivalent to selecting the element from the hierarchical list. The Caption mode then displays the elements contained in the selected node element. The selecting of a "Backtrack" icon situated on the right of the display zone makes it possible to go back through the hierarchy.

Generally the agencies centre 4 manages just one type of programme. Only a special mode opened by access to a higher

access right makes it possible to manipulate several types of programme. The various types of programmes managed by the agencies centre are picked from among the following collection: {folder, execution list, synchronized execution list, Interactive directory, catalogue, Module for executing programme lists, Advertisement insertion module, Training module, Module for managing stock market programmes} whose defining elements are given hereinbelow.

“folder”:

Description	Serves to group together and to organize.
Hierarchy	Any element or programme of the programmes agency, including folders.
Link-up	No

“PLAYLIST” “execution list”

Description	Management of noninteractive televisual programmes.
Hierarchy	Any noninteractive element of the programmes agency.
Link-up	Any site of the sites agency.

Function	Description
Generate	Initiates the generation of the source code → depending on the type of use, the code is generated in the native format (CityLine, Juke-Box, etc.) or sent to the generator.
Log file	No
Broadcast	Associates the programme with the site currently selected from the sites agency.

Property	Type	Description	Possible values
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System	Menu	Target system	StreamCast® I
Network	Menu	No	
Mode	Menu	No	
Palette	Menu	No	
Width	Num.	Max. width	0 to max. width of the screen on the TV screen (384 pixels on StreamCast® I)
Height	Num.	Max. height	0 to max. height of the screen on the TV screen (288 pixels on StreamCast® I)

System properties

Property	Type	Description	Possible values
Channel No.	Num.	Stream No. in the StreamCast® programme	1 to 255
Path No.	Num.	Path No. in the StreamCast® channel	1 to 255
Priority	Num.	Priority value for the automatic regulation of broadcasting of StreamCast pathways	1 to 255

"TIMED PLAYLIST" "synchronized execution list"

Description	Management of noninteractive televisual programmes with broadcasting grid.
Hierarchy	Any element of the programmes agency.
Link-up	Any site of the sites agency.

Function	Description
Generate	Initiates the generation of the source code → depending on the type of use, the code is generated in the native format (CityLine®, Juke-Box, etc.) or sent to the generator.
Log file	No
Broadcast	Associates the programme with the site currently selected from the sites agency.

Property	Type	Description	Possible values
System	Menu	Target system	StreamCast® I
Network	Menu	No	
Mode	Menu	No	
Palette	Menu	No	
Width	Num.	Max. width on the TV screen	0 to max. width of the screen (384 pixels on StreamCast® I)
Height	Num.	Max. height on the TV screen	0 to max. height of the screen (288 pixels on StreamCast® I)

System properties

Property	Type	Description	Possible values
Channel No.	Num.	Stream No. in the StreamCast® programme	1 to 255
Path No.	Num.	Path No. in the StreamCast® channel	1 to 255
Priority	Num.	Priority value for the automatic regulation of broadcasting of StreamCast® pathways	1 to 255

“CITYLINE” “interactive directory”

Description	Management of interactive televisual programmes of directory type regarding leisure and tourism.
Hierarchy	Any element of the programmes agency.
Link-up	Any site of the sites agency.

Function	Description
Generate	Initiates the generation of the source code → the code is generated in the native format and requires no sending to a generator.
Log file	No
Broadcast	Associates the programme with the site currently selected from the sites agency.

Property	Type	Description	Possible values
System	Menu	Target system	StreamCast® I
Network	Menu	No	
Mode	Menu	No	
Palette	Menu	No	
Width	Num.	Max. width on the TV screen	0 to max. width of the screen (384 pixels on StreamCast® I)
Height	Num.	Max. height on the TV screen	0 to max. height of the screen (288 pixels on StreamCast® I)

“catalogue”:

Description	Management of interactive televisual programmes of E-commerce type (electronic commerce: - OpenShop® = Catalogue on TPS®.
Hierarchy	Any element from the programmes agency, except: the folders and the programmes.

Link-up	Any site of the sites agency.
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Function	Description
Generate	Initiates the generation of the source code, then sends it to the generator.
Log file	Report file returned by the generator.
Broadcast	Associates the programme with the site currently selected from the sites agency.

Property	Type	Description	Possible values
System	Menu	Target system	OpenTV® Standard = broadcasting OpenTV SDK = tuning
Network	Menu	Broadcasting network	OnAir® network = broadcasting Internal Network = tuning
Mode	Menu	Execution mode	Release = broadcasting of programme Debug = tuning
Palette	Menu	Palette of 16 colours of the OSDs	The palette button makes it possible to create/ modify/edit the palettes. Cf. palette selection window. The palettes supervised are *.TXT files stored in the ROLclut folder
Width	Num.	Max. width on the TV screen	0 to max. width of the screen (720 pixels on OpenTV®)
Height	Num.	Max. height on the TV screen	0 to max. height of the screen (576 pixels on OpenTV®)

System properties

Property	Type	Description	Possible values
Stream No.	Num.	Stream identification No.	1 to 10.
Bit rate	Num.	Bit rate in bit/sec of the stream during its broadcasting.	Generally, from 150,000 to 800,000 b/s.
AddressIP	Text	IP address of the generator where the generated source code is sent (cf. TCP/IP protocol standard).	xxx.xxx.xxx.xxx

“module for executing the programmes lists” (JUKE-BOX):

Description	Management of televisual programmes of juke-box type, permitting playlist, timed-playlist and selection by the user of a clip or playlist.
Hierarchy	Any element from the programmes agency.
Link-up	Any site from the sites agency.

Function	Description
Generate	Initiates the generation of the source code → the code is generated in the native format and does not require any sending to a generator.
Log file	No
Broadcast	Associates the programme with the site currently selected from the sites agency.

Property	Type	Description	Possible values
System	Menu	Target system	StreamCast I®
Network	Menu	No	
Mode	Menu	No	

Palette	Menu	No	
Width	Num.	Max. width on the TV screen	0 to max. width of the screen (384 pixels on StreamCast I®)
Height	Num.	Max. height on the TV screen	0 to max. height of the screen (288 pixels on StreamCast I®)

“Advertisement insertion module” (ADS-INSERT)

Description	Management of televisual programmes for substitution on the advertisement spaces of theme channels transmitted over the network: - Financial Line® = Ads-Insert with the Bloomberg® channel.
Hierarchy	Any element from the programmes agency.
Link-up	Any site from the sites agency.

Function	Description
Generate	Initiates the generation of the source code → the code is generated in the native format and requires no sending to a generator.
Log file	No
Broadcast	Associates the programme with the site currently selected from the sites agency.

Property	Type	Description	Possible values
System	Menu	Target system	StreamCast I®
Network	Menu	No	
Mode	Menu	No	
Palette	Menu	No	
Width	Num.	Max. width on the TV screen	0 to max. width of the screen (384 pixels on

			StreamCast I®)
Height	Num.	Max. height on the TV screen	0 to max. height of the screen (288 pixels on StreamCast I®)

“Module for managing the stock market programmes” (INFO-STOCK)

Description	Management of interactive televisual programmes of stock market information type transmitted by a producer over the network.
Hierarchy	Any element from the programmes agency.
Link-up	Any site from the sites agency.

Function	Description
Generate	Initiates the generation of the source code → the code is generated in the XML format and requires no sending to the generator which itself detects the arrival of new files.
Log file	No
Broadcast	Associates the programme with the site currently selected from the sites agency.

Property	Type	Description	Possible values
System	Menu	Target system	MediaHighway (example)
Network	Menu	Network of OnAir Networks = broadcasting Internal Network broadcasting = tuning	
Mode	Menu	Mode of execution	

		Release = broadcasting of the programme Debug = tuning	
Palette	Menu	Palette of 16 colours of the OSDs	The palette button makes it possible to create/modify/edit the palettes. Cf. Palette selection window. The palettes supervised are *.TXT files stored in the ROLclut folder.
Width	Num.	Max. width on the TV screen	0 to max. width of the screen (720 pixels on MediaHighway®).
Height	Num.	Max. height on the TV screen	0 to max. height of the screen (576 pixels on MediaHighway®).

- The types of elements are specialized objects of the programmes agency making it possible to describe the programmes. These elements descriptive of the programmes are picked from the
- 5 following collection: {structure, video, sound, picture, text, design, page, list, slide show, scene, routing, instruction} whose defining elements are given hereinopposite.

“STRUCTURE”

Description	Serves to group together and to organize Note: unlike folders, the grouping together into a structure has a significance on the programme generated. The rules for grouping together into
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	a structure are individual to each generator.
Hierarchy	Any element of the programmes agency, including structures.
Link-up	No
Property	No

“VIDEO”

Description	Describes the characteristics of presentation of a video element in a programme.0
Hierarchy	No
Link-up	A video medium of the media agency

Property	Type	Description	Possible values
Width	Num.	Width of the element on the screen	0 = adjusts the size to the content
Height	Num.	Height of the element on the screen	0 = adjusts the size to the content
Coord. X	Num.	Left coordinate of the element on the screen. of the screen	0 to max. width
Coord. Y	Num.	Top coordinate of the element on the screen	0 to max. height of the screen.
Duration	Num.	Duration of display of the element on the screen	- Expressed in HH:MM:SS:CC (2 min. 50 sec. = 00:02:50:00)- 0 = adjusts the duration to the content

“SOUND”

Description	Describes the characteristics of presentation of an audio element in a programme
Hierarchy	No
Link-up	An audio medium of the media agency

Property	Type	Description	Possible values
Duration	Num.	Duration of display of the element on the screen	Expressed in HH:MM:SS:CC (2 min. 50 sec. = 00:02:50:00)- 0 = adjusts the duration to the content

“PICTURE”

Description	Describes the characteristics of presentation of a picture element in a programme
Hierarchy	No
Link-up	A picture medium of the media agency

Property	Type	Description	Possible values
Usage	Menu	Determines the particular usage for which the element is intended	List of values of the T_FUNCT table.
Width	Num.	Width of the element on the screen	0 = adjusts the size to the content.
Height	Num.	Height of the element on the screen	0 = adjusts the size to the content.
Format	Menu	Format of the picture on the target system	List of values of the T_PICTURE table.
Weight	Num.	Max. size of the file in the target format	Weight in bytes.

Quality	Num.	Quality of compression	Quality in % of compression (cf. generators doc).
Coord. X	Num.	Left coordinate of the element on the screen	0 to max. width of the screen.
Coord. Y	Num.	Top coordinate of the element on the screen	0 to max. height of the screen.
Duration	Num.	Duration of display of the element on the screen	Expressed in HH:MM:SS:CC (2 min. 50 sec. = 00:02:50:00)- 0 = permanent display.

(1) Appearance properties

Property	Type	Description	Possible values
X	Num.	Ditto Coord. X for the point of appearance of the element	0 = no effect
Y	Num.	Ditto Coord. Y for the point of appearance of the element	0 = no effect
Pulse	Num.	Instant (or time code) of appearance of the element on the screen	Expressed in HH:MM:SS:CC (2 min. 50 sec. = 00:02:50:00) - 0 = no effect

"TEXT"

Description	Describes the characteristics of presentation of a text element in a programme.
Hierarchy	No
Link-up	A text element of the programmes agency.

Property	Type	Description	Possible values
Usage	Menu	Determines the particular usage for which the element is intended	List of values of the T_FUNCT table.
Width	Num.	Width of the element on the screen	0 = adjusts the size to the content.
Height	Num.	Height of the element on the screen	0 = adjusts the size to the content.
Palette	Text	Recalls the current palette, identical for the programme	The palette button makes it possible to modify the colours. cf. palette selection window.
Colour	Menu	Colour of the text on the screen	Colour in the current palette (No. ranging from 0 to 15).
Col.Bis	Menu	2nd colour used depending on the generator: selection, background	Colour in the current palette (No. ranging from 0 to 15).
Font	Menu	Character font	List of fonts available in the ROExp folder.
Anchoring	Menu	Position of the text with respect to the anchoring point: Coord.X/Coord.Y	All the combinations from: Horizontal: left, centre, right - Vertical: top, centre, bottom

			Line: up, down.
Line gap	Num.	Height of a line (in pixels)	0 to max. height of the screen - 0 = default line gap.
Coord. X	Num.	Left coordinate of the element on the screen	0 to max. width of the screen.
Coord. Y	Num.	Top coordinate of the element on the screen	0 to max. height of the screen.
Duration	Num.	Duration of display of the element on the screen	Expressed in HH:MM:SS:CC (2 min. 50 sec. = 00:02:50:00) - 0 = permanent display.

Appearance properties

Property	Type	Description	Possible values
X	Num.	Ditto Coord. X for the point of appearance of the element	(cf. Anchoring, on the left by default) -0 = no effect.
Y	Num.	Ditto Coord. Y for the point of appearance of the element	(cf./Anchoring at the top by default) -0 = no effect.
Pulse	Num.	Instant (or time code) of appearance of the element on the screen	Expressed in HH:MM:SS:CC (2 min. 50 sec. = 00:02:50:00)- 0 = no effect.

"DESIGN"

Description	Describes the characteristics of presentation of a design element in a programme
Hierarchy	No
Link-up	No

Property	Type	Description	Possible values
Usage	Menu	Determines the particular usage for which the element is intended	List of values of the T_FUNCT table.
Width	Num.	Width of the element on the screen	0 = invisible.
Height	Num.	Height of the element on the screen	0 = invisible.
Palette	Text	Recalls the current palette, identical for the programme	The palette button makes it possible to modify the colours. cf. palette selection window.
Line style	Menu	Colour of the edge	Colour in the current palette (No. ranging from 0 to 15).
Background	Menu	Fill-in colour	Colour in the current palette (No. ranging from 0 to 15).
Coord. X	Num.	Left coordinate of the element on	0 to max. width of the screen.

		the screen	
Coord. Y	Num.	Top coordinate of the element on the screen	0 to max. height of the screen.
Duration	Num.	Duration of display of the element on the screen	Expressed in HH:MM:SS:CC (2 min. 50 sec. = 00:02:50:00)- 0 = permanent display.

Appearance properties

Property	Type	Description	Possible values
X	Num.	Ditto Coord. X for the point of appearance of the element	0 = no effect
Y	Num.	Ditto Coord. Y for the point of appearance of the element	0 = no effect
Pulse	Num.	Instant (or time code) of appearance of the element on the screen	Expressed in HH:MM:SS:CC (2 min. 50 sec. = 00:02:50:00) - 0 = no effect

"PAGE"

Description	Determines a page on the screen: - all the elements contained in the page will be displayed at the same time - all the elements contained in the other pages are not displayed
Hierarchy	Any terminal element of the programmes agency
Link-up	No
Property	No

“LIST”

Description	Determines a list of menu type of headings on the screen: - all the elements contained in the page will be displayed at the same time - all the elements contained in the other pages are not displayed.
Hierarchy	Any terminal element of the programmes agency. - To operate correctly, the daughter hierarchy of the list must be organized as follows: - all the elements common to all the headings (the cursors, etc.) - as many structure elements as different headings, the structure element defines the concept of heading in the list; Each structure element defining a heading must in turn be organized as follows: - at the 1st level: the elements which constitute the banner of the heading, that is to say that which is displayed in the list is the one which can be selected. This level must contain no element to be displayed when the heading is selected. - at the 2nd level: in a substructure, all the elements of content, that is to say that which must be displayed when the heading is selected.
Link-up	No
Property	No

“SLIDE SHOW”

Description	Determines a noninteractive sequence on the screen: - all the elements contained in this element form a single entity - the elements will be displayed according to the time delays advised in the “Duration” and “Pulse” properties
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	of each element, as well as the behaviour specified in the "Usage" property. The properties of the elements contained in a slide show element are: - Pulse: indicates the instant (or time code) at which the element must appear - Duration: indicates the duration during which the element must remain displayed - Usage: specifies the behaviour which the element must have after its duration of display has elapsed: - "AnimationLoop": indicates the restarting of animation - "AnimationShow": indicates that the element is to remain displayed - "AnimationHide": indicates that the element is to be erased.
Hierarchy	Any terminal element of the programmes agency.
Link-up	No
Property	No

"SCENE"

Description	Determines a complete scene, that is to say an interactive screen with all its elements and behaviour. The scene is the default display element. By clicking on "Display" the agency simulates the presentation and behaviour of the screen such as on a TV screen.
Hierarchy	Any element of the programmes agency.
Link-up	No

Function	Description
Display	Initiates the Predisplay of the scene such as on a TV screen.

Property	Type	Description	Possible values
Usage	Menu	Determines the particular usage for which the element is intended.	List of values of the T_SCENE table: - First screen: indicates to the generator that the application will have to begin by displaying this scene - Screen exit: indicates to the generator that this screen is to be displayed when the user exits the application - Screen Information: indicates to the generator that this screen is to be displayed when the user presses the Information key.

"ROUTING"

Description	Determines a navigation behaviour. The routing element makes it possible to declare which scene screen to go to after having clicked. It is also possible to add a condition thus allowing navigation to be routed as a function of the user's manipulations
Hierarchy	No
Link-up	No

Property	Type	Description	Possible values
Scene	Text	Name of scene to go to.	Exact name - including upper case/lower case - of

			a scene belonging to the same programme.
Condition	Text	Expression corresponding to a test to be performed to go to the specified scene.	<p>The block underneath the property makes it possible to help with the composition of the expression:</p> <ol style="list-style-type: none">1) Choose the nature of the expression to be constructed:-Function - Variable - Operator (cf. functions and variables available - ROLquery).2) Select from the mini-list from underneath the appropriate expression.3) Press Add or double click on the expression to copy it to the zone above.4) Continue in this way until the expression has been constructed in full (punctuation is performed automatically). It is possible to construct several expressions starting on a new line each time. It is possible to consult the functions and their parameters, the variables and their values, without copying to the

			zone, by pressing the Continue and Return buttons.
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"INSTRUCTION"

Description	Describes one or more instructions - function - to be executed. The instruction-element makes it possible to declare mini-procedures which will have to be performed in a scene and possibly displayed on the screen in the case of input modules for example. The nature of the declarable expressions depends entirely on the generators which need to utilize them (cf. generator doc.).
Hierarchy	No
Link-up	No

Instruction	Text	Expression corresponding to one or more instructions to be performed in the current scene.	The block underneath the property makes it possible to help with the composition of the expression: 1) Choose the nature of the expression to be constructed: - Function - Variable - Operator (cf. functions and variables available - ROLquery). 2) Select from the mini-list from
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			<p>underneath the appropriate expression.</p> <p>3) Press Add or double click on the expression to copy it to the zone above.</p> <p>4) Continue in this way until the expression has been constructed in full (punctuation is performed automatically). It is possible to construct several expressions starting on a new line each time. It is possible to consult the functions and their parameters, the variables and their values, without copying to the zone, by pressing the Continue and Return buttons.</p>
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V. THE SITES AGENCY

5 The Sites agency is specialized in the distribution of the programmes created or updated with the Programmes agency. It

adopts a green colour code which renders it easily recognizable from among the three agencies of the centre, and borrows all the characteristics of an agency window as explained above. Only the objects and functions required for the specific management of the sites have been inserted.

VI. THE GENERATOR AND THE LOW-LEVEL LANGUAGE

The agencies centre 4 cooperates with a generator or transcoder 11 in a digital television applications generator which makes it possible to produce generic or nongeneric applications. Generic applications are interactive programmes whose behaviour is predictable, and whose interface and content can still be parametrized and customized.

These programmes are constructed from basic elements such as: page, picture, text, design, etc., each of these elements having well-defined properties and functionalities which are however modifiable. This set of elements thus makes it possible to implement series of screens corresponding to most of the functions required for the digital television applications: Home page, Résumé, Information, Questionnaire, etc.

The applications implementable with these types of screen cover a broad palette of standard applications: EPG, Weather, road traffic, etc., E-commerce, Catalogue, etc., Magazine, PLV, etc., Advertisements, Stock market information, etc.

The technology relies on three complementary software tools:

- The agencies or agency centre 4, "front-office" which makes it possible to describe and parametrize its applications;

- The generator 11, "back-office" which makes it possible to transcode the applications emanating from the agency;
- The reader 26, "runtime" which makes it possible to run the application code produced by the generator 11 on the customer's station 2.

These three elements can be situated on different stations or even different sites. This is obviously the case for the reader which must be installed on each of the machines needing to broadcast the television application. Depending on the terms of installation these elements communicate either by LAN local area network, FTP Internet file transfer or satellite.

In a variant of the embodiment of Figure 1, the low-level language generator 11 is implemented on a separate set, whilst at least one other set executes the agencies centre 4. The two sets are linked by known means, and the set carrying the generator also contains part of the agencies centre 4 which allows it to execute the tuning of the programmes with the aid of the description generator 30 and the errors manager 31 in respect of tuning.

In another variant, represented in Figure 6, the agencies centre is divided into several groups of sets which will be described later and which execute the development or the updating of one or more interactive television applications according to a given life cycle.

The various tasks of the life cycle of a TV application are then undertaken according to the flowchart of Figure 6:

- A) the implementation of the applications
- B) the generation of the applications

- C) the distribution of the applications
- D) the execution of the applications
- E) the administration of the digital television applications according to the invention.

5

The implementation of the digital television applications according to the invention is performed with the agency, based on an integrated application model which merely needs to be duplicated and/or parametrized in its way. This integrated model

10 is prepared and frozen, so as to be fully synchronized with the generator 11 which transcodes the applications thus implemented.

For each application, the agency can be a centralized or remote station, or even one which is downsized, in customer-server mode.

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The agency also makes it possible to display the desired result before initiating the generation of the application. In the case of

20 utilization in customer-server mode, only the main station can display the collection of applications implemented by several remote users.

The generation of the applications is effected with the generator

25 11, at the request of the agencies connected or according to a parametrizable schedule.

The generator produces a compressed transcription of the application in a format which can be run by the customer station

30 reader, then transmits it to the stream server which distributes it over the designated network.

With each generation, the generator draws up a balance sheet which it sends back to the calling agency, so as to advise it that everything has run correctly or that errors have been noted, together with any corrections thereto.

5

Figure 7 again shows the network of the embodiment of Figure 1, in a variant tailored to several producers and several groups of customers. Each of the phases of the flowchart is plotted in the figure opposite the means of the network which are mainly used therein.

10

On the left of Figure 7 are the means of the network which are mainly mobilized during phase A) of implementing the interactive television applications. Several groups 60-0 to 60-N of implementers are connected to a single production entity 63. Each Implementation group such as the group 60-0 comprises a main agency 61 to which secondary agencies 61-1, 61-2, ..., 61-n are connected.

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Each of the secondary agencies is characterized by the possession of rights of access to the resources and to the projects available at the level of the implementation group 60-0 to which they belong which are different and reduced. The programmes and ties of the application currently being created or updated are exchanged locally under the control of the main agency 61. Each main or secondary agency comprises a deployment of the agencies centre already described with the aid of Figures 1 et seq., the agencies manager of each of the main 61 or secondary 61-i agencies being furnished with a controller of access rights specific to each of the implementation agencies, main or secondary. This allocation is especially favourable to cooperative working in which the implementation operators work

25

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hard for chunks of television programmes, for example through audiovisual speciality.

5 The main agencies 61, 62 of the implementation groups 60-0 to 60-N are connected by a bidirectional link to a General agency 64 disposed in a production station 63, and they exchange the interactive television applications with it during the production process. The latter is essentially executed on a production station 63, there being a single such station in the television
10 network of the invention.

The generator of interactive digital television applications, in a low-level language and multiplatforms, is deployed in a module 65, installed on the production station 63 and global to all the
15 digital television users according to the invention. The General agency 64 - administrative - is associated therewith for managing generation parameters, in particular automatic generation scheduling. During the production process, the administrative agency 64 assembles the various programmes and applications
20 received from the various main agencies 61, 62 and produces a single application which it transfers to the generator 65. During production of the multiplatform low-level language codes, the generator 65 as was explained with the generator 11 and the descriptions generator 30 and the errors manager 31 returns
25 error messages to the Administrative agency 64 which can then either solve the problem generating each error or else return a correction request message to the main implementation agency 60 or 62 concerned.

30 The generator 65 can receive several generation commands simultaneously. A queue is automatically created and the applications are processed one after the other. Should a rise in

load occur, it is possible to install several generators such as the module 65 in parallel.

When the applications tuning process has terminated on the
5 production station, the generator 65 transmits its code and its
data to a data and streams management module 66 which
executes in real time. The data and streams management module
66 is connected by a suitable channel such as a local area
network or the like to a distribution system 67. The distribution of
10 the applications is effected via the stream server 68, whose
hardware and installation depend on the broadcasting supports.

The digital television operator (such as CanalSat®) is itself
responsible for distributing the streams containing the
15 applications generated.

The General agency 64 on the production system 63 references
the entire distribution system so as to give the generator 65 the
means of sending the transcoded applications to the stream
20 server 68. The latter is connected to a bidirectional broadcasting
channel on at least one broadcasting network such as the
broadcasting networks 69-0 to 69-P. Each broadcasting network
can be under the supervision of its own operator or have the
same operator and comprise an unspecified number of customer
25 stations such as stations 70-0 to 70-p of the broadcasting
network 69-0.

The applications are executed by the customer station's reader
(similar to the reader 26 of the customer station of Figure 1)
30 installed in the decoders. The reader itself is distributed by the
stream, so that it can be downloaded by the decoders.

An identification system can serve to determine the network of decoders of each digital television application according to the invention. Thus, the decoders will have access only to the multichannel package relevant to them. This identification system
5 can be managed by the General agency 64.

The entire network consisting of the digital television users according to the invention is modelled, managed and administered from the General agency 64. Each new digital
10 television application according to the invention is the subject of a registering of its implementation stations and of its broadcasting network with the General agency 64. This organization makes it possible among other things to cater for all the monitoring and maintenance operations.

The assembly consisting of the production system 63 - generator
15 - and distribution system 67 - stream server - is therefore modelled, managed and administered from the General agency 64. The configuration of the generators is registered in each
20 implementation station 61, 62 before any remote installation.

During the execution of a television programme on one of the customer stations of one of the broadcasting networks, such as the station 70-0 of the network 69-0 for example, data and
25 commands are returned on the broadcasting channel, these being managed by the stream server 68 which can then as a function of the execution of the programme element in progress open a given resource or stream on the data and real-time stream module 66. Such is the case when choosing a new
30 programme, a screen, a scene or any other element, or when giving textual information.

VII. DESCRIPTION OF AN INTERACTIVE TV APPLICATION

A digital television application according to the invention consists of several types of information which are utilized according to the levels by processing means disposed on the worksets or the customer stations, the information types being:

- The parameters individual to each application and valid for all the other elements making up the application: the colours, etc.;
- The broadcasting parameters making it possible to identify the channel on the customer station;
- The screens of the application, that is to say how each of the components appears depending on the navigation context in the application;
- The data of the application, that is to say the actual content of the application: picture, text, etc.

In the subsequent description, the parameters for specifying the interactive television programme or application elements are manipulated by processing means constructed with the aid of one or more of the following means: data and address in memory, computational resource on a customer station, implementation system, production system, distribution system. The processing can consist of an edit, a create, an update, a parametrization, a save, a link or some other processing of a class or of a particular computing framework.

The parameters for defining the digital television programmes and applications according to the invention are specified in the following way:

Information	Comment
Name	Label designating the application
ID	Identifies the application uniquely
Palette	Determines the list of 16 colours available for the TV Objects displayed on the screen
DVB trio	Determines the access to the application being broadcast
List of TV scenes	Cf. definition of a TV scene - All the scenes - screens - of this list are copiable, modifiable and customizable

A scene consists of a collection of objects whose appearance and behaviour depend on one another screen-wise. Three types of scenes may be distinguished:

- 5
- Single scenes;
 - Multipage scenes;
 - Scenes with menu-list.

10 A single scene is a scene all of whose component elements are present as soon as it is displayed on the screen. There is no system for scrolling pages or for choosing from among a list of elements.

A single scene is specified in the following way:

Information	Comment
Name	Label designating the scene
Duration	Duration of the display of the scene (Time Out)
List of TV Objects	Cf. definition of a TV Object - The objects of this list are individual to the scene and remain displayed as long as the scene is played on the screen. They disappear upon a change of scene

The elements - TV Objects - which make up this scene are basic and allow picture management, text management and design management on the screen.

- 5 A multipage scene includes a system for scrolling the pages. This type of scene makes it possible to implement consultation screens: Magazine pages, Pages of advertisements, Product details, Help pages, Legal information etc.

- 10 A multipage scene is specified in the following way:

Information	Comment
Name	Label designating the scene
Duration	Duration of display of the scene (Time Out)
List of TV Objects	Cf. definition of a TV Object - The objects of this list are common to the scene and will remain displayed with each page
List of TV pages	Cf. definition of a TV page

A menu-list scene is a single scene which includes a system making it possible to choose from among a list of elements. This type of scene makes it possible to implement selection screens:

- 15 Selection of a page, Selection of a functionality, Selection of a product, of a region, of a category, Multiple choice questionnaire, Menu of a résumé, etc.

A menu-list scene is specified in the following way:

Information	Comment
Name	Label designating the scene
Duration	Duration of display of the scene (Time Out) - The objects of this list are common to the

	scene and will remain displayed, independently of the choices made from the menu-list
TV menu-list object	Cf. definition of a TV menu-list

5 A TV page is an object which makes it possible to manage several pages on a single screen. The pagination functions are automatically undertaken by the reader of each customer station of a digital television application according to the invention.

Information	Comment
Name	Label designating the page
Duration	Duration of display of the page (Time Out)
List of TV Objects	Cf. definition of a TV Object

10 The objects of this list are individual to the page and will be displayed with the next page (the objects common to the scene remain displayed).

A TV menu-list is an object which makes it possible to manage several choices on a single screen. The selection functions are automatically dealt with by the reader of each customer station.

Information	Comment
Name	Label designating the list
List of TV Objects	Cf. definition of a TV Object - The objects of this list are common to the scene and remain displayed, independently of the changes of heading in the menu
List of headings	Cf. definition of a heading

In the subsequent description, the term “highlighted” designates the property of an object of being selectable at a given instant in a given process, while generating an application or during its execution on a customer station in particular. A menu-list heading is specified by:

5

Information	Comment
Name	Label designating the heading
List of TV Objects	Cf. definition of a TV Object - The objects of this list represent the heading on the screen. They are automatically displayed on the screen and may be highlighted
TV page object	Cf. definition of a TV page - This object contains all the contents associated with the heading. They are automatically displayed when the heading is highlighted

The TV Objects are the content elements, specifically designed for televisual display. There are three of them:

10

- The text objects;
- The designs objects;
- The pictures objects.

15

Each TV Object contains generic information (the position on the screen, the duration of display, etc.) and specific information (the colour of a text, the size of a design, etc.).

Definition of a text object

Information	Comment
Name	Label designating the text object
Command	Command managing the superposition of TV Objects

Duration	Duration of display of the text object, in MM:SS:CC
Start	Start of display of the text object in the page, expressed in MM:SS:CC
Position	Position of the text on the screen, expressed in X,Y coordinates (cf. Framing)
Colour	Colour of the text on the screen, from the 16 colours of the palette of the programme (cf. Palette), expressed as a line colour and background colour
Font	Font and size of display of the text - Expressed as a name and body of the text. The CanalSat® decoders permit bodies of 18 and 21
Framing	Determines the position of the text with respect to the point X,Y. The framing may be horizontal (left, centre, right) and vertical (top, centre, bottom)
Line interval	Determines the gap between two lines, in pixels
Character interval	Determines the gap between two characters, in pixels
Content	References the file containing the text

Definition of a design object

Information	Comment
Name	Label designating the design object
Command	Command managing the superposition of TV Objects
Duration	Duration of display of the design object, in MM:SS:CC
Start	Start of display of the design object in the page, expressed in MM:SS:CC
Position	Position of the top-left corner of the design on

	the screen, expressed in X,Y coordinates
Colour	Colour of the design on the screen, from the 16 colours of the palette of the programme (cf. Palette), expressed as an edge colour and fill-in colour
Size	Size of the design on the screen, in terms of height and width
Type of design	Determines the shape of the design: squares, rectangles, rounded edges, etc.

Definition of a picture object

Information	Comment
Name	Label designating the picture object
Command	Command managing the superposition of TV Objects
Duration	Duration of display of the picture object, in MM:SS:CC
Start	Start of display in the page, in MM:SS:CC
Position	Position of the top-left corner of the picture on the screen, expressed in X and Y coordinates (multiples of 16 for MPEG images)
Type of picture	Determines the way in which the picture should be processed on the decoder: MPEG or PIXMAP - an MPEG picture is not limited to 16 colours (cf. Palette) but is necessarily displayed behind all the other TV Objects of the screen (an MPEG picture cannot hide a text, a design or a PIXMAP picture) - A PIXMAP picture is limited to 16 colours (cf. Palette) but can be displayed above any other TV Object
Quality	Compression of the MPEG picture (in terms of weight or amount)

Content	References the file containing the picture
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There are also two other TV Objects intended for implementing the navigation and execution functions of off-the-shelf modules:

- The routing objects
- 5 • The instruction objects

Definition of a routing object

Information	Comment
Name	Label designating the routing object
Scene	Indicates the scene to go to
Condition	Specifies the conditions under which one goes to the scene indicated. - For example: {KeyPressed} = OK

Definition of an instruction object

Information	Comment
Name	Label designating the instruction object
Instruction	Indicates the instruction module to be initiated.

- 10 The instruction modules are predefined and operational, only the parameters are modifiable by the user. Exemplary modules are: Connection, Message, Payment, Zapping, etc.

VIII. LOW-LEVEL LANGUAGE AND MARKERS

- 15 The multiplatform generator or transcoder of the invention operates according to a low-level language, distinguishing the manner of operation of the codes generator (generator 12 - Figure 1) which produces the user interfaces, and the manner of operation of the data generator (generator 14 - Figure 1) which produces the contents. Each digital television application is
- 20 therefore transcoded into lines of codes by a generator or

transcoder configured as a function of the target digital television platform.

5 The digital television programme is therefore chopped into unit blocks compatible with the constraints of the target systems (digital television platforms marketed as OpenTV® or StreamCast®). Each unit block corresponds to a scene such as was already described above and comprises a plurality of programme lines in low-level language produced by the
10 generator or transcoder.

Each television programme line comprises at least one of the following elements:

- identification;
- 15 • type;
- content;
- properties;
- link-ups.

20 The type element is a combination of the following information:

- if the object concerned is "highlightable", simply displayable or if it concerns another type of object (function, routing, instruction, etc.);
- if the object is unitary (text object, design object, picture
25 object, etc.) or multiple (slide show, page, list, table, menu-list, TV page, multipage, etc.).

The identification element makes it possible to pinpoint the typed object in the interactive television programme. It is unique for
30 each typed object.

The content element reproduces the contents of the typed object. These are produced by the data generator (generator 14 - Figure 1).

- 5 The properties element reproduces the properties of the programmed object in the interactive television programme unit block.

10 The link-ups element reproduces the list of references linked with the programmed typed object in the interactive television programme unit block. Each link-up corresponds to a dependent object or to a content of the object to which it is attached such as the elements of a scene or of a page, the highlighting of a "highlightable" element, an action to be implemented from the customer station, etc.

15 The unit objects of the interactive television programmes correspond to analogous objects with the same name which were already described at the level of the agencies and of the generator. These are videos, sounds, pictures (MPEG or OSD), texts, designs, TV channels.

20 The unit multiple objects of the interactive television programmes correspond to analogous objects of the same name which were already described at the level of the agencies and of the generator. These are slide shows, TV pages, TV lists, tables, trees.

25 Other objects are reserved for the management of scenes. These are scenes objects, single scenes, multipage scenes, menu-list scenes.

30

Other objects are reserved for the management of functions. These are routing and instruction objects. In this way the collection of objects contained in the programmes is transcoded into a low-level language directly utilizable on the customer stations regardless of the type of platform deployed.

5